

7.0 SYSTEM POLICIES AND MANAGEMENT

Policies and procedures employed by the City Police Department and by LM/ACS governing the management of the program were reviewed and considered from the point of view of the many stakeholders involved in the deployment and operation of the City's photo enforcement system.

7.1 METHODOLOGY

LM/ACS personnel involved in the management and administration of the photo enforcement system were interviewed at the beginning of the project. At that time, the full procedures for administering the system were explained and demonstrated. The initial interviews were followed up with subsequent visits to the LM/ACS facility to collect data, conduct audits of photographic and equipment maintenance records, and to examine the procedures that are in place for the photo enforcement program.

Additionally, selected individuals at the San Diego Police Department Traffic Division were interviewed to determine the full scope of the procedures, review the history of the program and its development, and to examine the City's program management procedures. City Traffic Engineering Department officials were also interviewed for insights into their involvement with the photo enforcement equipment installations, loop installations, traffic signal timing adjustments made at certain photo-enforced intersections, and on-going traffic safety improvement activities.

Lastly, a representative of the San Diego Superior Court was also interviewed to review selected aspects of the Court's experience with the program.

Data from photo enforcement programs underway in other cities in California and elsewhere in the United States were obtained and used in this review. A review of these photo enforcement programs was undertaken to determine if methods used to deploy systems in San Diego are similar or different to those used in other parts of California and elsewhere and the extent to which their experience could be incorporated into an expanded program for the City of San Diego.

7.2 PHOTO ENFORCEMENT SYSTEM OPERATIONS

LM/ACS is responsible for the day-to-day operations and maintenance of the photo enforcement system, under the overall direction of the City Police Department. In this capacity, LM/ACS is responsible for the following functions:

- Collect camera film and data for 19 photo-enforced intersections
- Inspect camera and vehicle detection system operations
- Perform preventative maintenance and cleaning
- Identify defective equipment and make repairs or replace
- Process film and memory card data
- Identify violations
- Identify vehicle registered owner
- Prepare citations for Police Department review and approval
- Mail citations
- Answer telephone inquiries
- Schedule violator appointments

- Process Section D citations
- Provide court-requested information and support court hearings
- Prepare monthly progress reports

In conducting this review, PBF examined the procedures used by LM/ACS in connection with the City's photo enforcement program and, additionally, audited a sample of violations from the LM/ACS violations database as well as selected camera unit service and equipment repair records.

From the project team observations and audit results, the procedures and methods applied by LM/ACS are generally proper and being applied in a timely manner consistent with the requirements of the California Vehicle Code. The procedures and methods are designed to ensure the chain of evidence for each recorded violation so that backup data and documentation can be easily retrieved when needed. Internal quality control is maintained by a double blind internal review of each violation. Additionally, all citations prepared by LM/ACS are reviewed and approved by the Police Department before they are issued. It is noted that LM/ACS provides similar system operation and citation processing services to a number of other cities in California and elsewhere using, for the most part, the same internal procedures and methods.

The major deficiency identified in the system operating procedures relates to the difficulties experienced as a result of the vehicle detection loops being moved at three intersections without corresponding adjustments in the pitch calculations and citation preparation guidelines. These difficulties were the result of a significant breakdown in the communications between LM/ACS and the City Police Department. However, it should be pointed out that the re-location of these loops and the implications of their re-location was of much greater importance for the City, because of the unique loop configuration used at the City's photo-enforced intersections, than would be the case for other installations where the vehicle detection loops are configured in accordance with the manufacturer's recommendations and established photo enforcement practice.

In addition to the internal procedures and methods used by LM/ACS, it is perhaps more important that the Police Department procedures be comprehensive, clearly documented in writing, and followed without exception to the maximum extent possible. In particular, the procedures should address in detail the following items:

- Guidelines to be applied for issuing a citation, in other words, a very specific definition of what constitutes a red light running violation;
- Citation review and approval requirements, including provisions for the procedure to be used when the time to review is shortened, traffic officers are not available to conduct the reviews, or the number of citations is larger than usual; and
- Quality assurance audits, to be conducted by trained traffic officers for randomly selected sample of recorded violations on a periodic basis.

It is also possible that the City could take on added responsibilities for certain system operations and citation processing functions. These functions can be done internally or by outsourcing as is currently done by the City.

7.3 PHOTO ENFORCMENT SYSTEM MAINTENANCE

When operating, each camera unit is serviced every 2-3 days depending on the number of photographs taken. The date and time of service, the location code and camera unit number, and the total number of exposures are recorded in the service log. The film and memory card are removed from the camera unit and replaced. The camera unit and cabinet interior are cleaned and the condition of the pole, cabinet, loops, camera unit, and warning signs are inspected and noted in the service log. At the end of the servicing, the camera unit is activated in its "test" mode and, if operating correctly, it is noted that the camera unit was observed to be functioning correctly.

LM/ACS has carried out the required equipment servicing and inspection functions since the system startup. LM/ACS has maintained service and inspection logs for the photo enforcement equipment installed at the 19 intersections from the period of their installation to the time at which the cameras were turned off in June 2001. The equipment service logs were reviewed for the three months of operation before the system was turned off for selected intersections. From the service logs, there was no indication of any unusual equipment malfunctions or problem areas during this period. The service logs also confirmed that LM/ACS was carrying out its equipment service and inspection functions as required.

7.4 PUBLIC AWARENESS AND INFORMATION

One of the most important aspects of a successful photo enforcement program is effective public awareness and information campaign. Research has indicated that public information campaigns may "make or break" automated red light enforcement programs and that some programs, in the past, have discontinued operations due to a lack of public support.

According to a study recently completed by the Federal Highway Administration, a public awareness and information campaign is needed to accomplish three objectives in connection with the implementation of photo enforcement programs. First, public awareness and information will make citizens more aware of their driving patterns and may help stimulate a voluntary change in behavior at signalized intersections. Second, open communications through a variety of media with the public and with elected officials in explaining program objectives as well as program results will be critical to gain public support for program expansion. Lastly, public awareness and information will provide motorists with advance warning that there is increased enforcement on the street. This, by itself, may cause a shift in driving patterns but should also serve to limit the amount of hostility and bad feelings towards these systems. Photo enforcement programs will not succeed if they become associated with the outdated image of a small town police officer parked behind a billboard at the edge of town, waiting for unsuspecting motorists. Without an appropriate educational campaign, motorists may be surprised or confused when they receive a citation. If questions or concerns can be effectively answered through written, telephone, or web-based information, motorists receiving citations will be more supportive of the program and less likely to become hostile and question the program's overall objectives.

A review of literature found that public awareness and information campaigns are frequently used prior to and during the development of a photo enforcement program. The campaigns often employ a variety of methods in an effort to reach as many citizens as possible. The extent of the campaigns, however, varies among the jurisdictions where photo enforcement systems have been deployed. Table 7-1 identifies some of the more commonly used methods to increase public awareness and provide information.

Table 7-1
PUBLIC AWARENESS AND EDUCATION CAMPAIGN ELEMENTS
USED BY SELECTED PHOTO ENFORCEMENT PROGRAMS

Jurisdiction	Posters	Mailings	Hand outs	Media	Warning Notices	Billboards	Warning Signs	Press Releases	Slogans	Bumper Stickers
Charlotte	X	X	X	X	X	X	X	X	X	X
Fairfax		X		X	X		X	X		
Howard County	X		X	X	X		X			
Lincoln				X		X				
New York				X	X		X			
Oxnard	X		X	X					X	X
Polk County					X		X			
San Francisco				X	X	X	X	X		X
<i>San Diego</i>		X		X			X	X		

According to the Federal Highway Administration, a recent poll conducted for Advocates For Highway And Auto Safety found that “65 percent of Americans favored adoption of legislation to allow use of red light cameras”. Support for the use of photo enforcement cameras is above 80 percent in larger cities and communities with established photo enforcement programs.

The City of San Francisco has a continuing public outreach and information campaign in connection with the City’s photo enforcement program and monitors progress in terms of public awareness and acceptance through regular surveys. Fairness through uniform geographical coverage as well as an overall approach to enhancing traffic safety that includes intersection improvements, traffic signal timing adjustments, and the use of photo enforcement cameras are elements of the philosophy that is being developed in San Francisco.

San Diego’s efforts to increase public awareness and information appear to have been limited. An informational mailer that described the program was included in utility bills at the startup of the program. Some information about the program is included in the citation package. Two surveys of public opinion have been conducted. In 1998 as the program was starting, 45 percent of those responding to the survey were strongly in favor of the City’s photo enforcement program. However, by February 2000 when the second survey was conducted, the approval rating had slipped to 41 percent. The adverse media coverage for the program has been extensive while the benefits from reduced red light running and fewer collisions attributable to red light running have received little publicity.

An important aspect of the public awareness and information campaign relates to the telephone information procedures used by LM/ACS for providing information to individuals receiving citations in the mail and for scheduling appointments so that any of these individuals, if desired, can meet with traffic officers to review their citation and view the photographic evidence. Since the San Diego system was not functioning at the time of the review, there was no opportunity to

listen and comment on the actual handling of these requests by LM/ACS personnel. For public relations purposes, the City should give consideration to handling all information and appointment requests internally, offering both telephone and web-based opportunities to the public.

It is also important for the success of the photo enforcement program that traffic court officials, including traffic judges, commissioners, and administrative support personnel, be fully informed about the program. Pro-tem officials often conduct traffic court hearings and, as such, these officials may not be fully versed in the operation of the photo enforcement equipment. For court hearings, data packages for citations that are being contested need to be prepared in a thorough and timely manner so that these citations are upheld. The increased use of methods that allow for electronic data transfers and viewing may be appropriate to ensure the court packages are readily available when needed.

The City's photo enforcement program should not be re-started without a comprehensive public awareness and information campaign in connection with the on-going operation and development of its photo enforcement program. This recommendation is of equal importance to the earlier recommendation regarding re-location of the vehicle detection loops before the program is re-started.

Outreach efforts to schools, driver education, and local community groups and the media are needed. Reports of results of the program, emphasizing safety benefits achieved, should be posted on a program web site. The campaign should employ various communications media designed to reach as many community residents as possible, include regular surveys to gauge public support and awareness, and be focused on a central message of improving traffic safety, for which photo enforcement can be applied as an effective tool to reduce collisions resulting from red light running.

7.5 PROGRAM DEVELOPMENT

Analysis of the red light running violations and accident data for the City's photo-enforced intersections, together with the lessons learned from other cities with similar programs, confirm that red light camera enforcement is effective in reducing red light running and improving traffic safety. However, photo enforcement should not be viewed in isolation. There is no one remedy for the traffic safety improvements or the reduction in collisions at signalized intersections but rather a toolbox of measures all of which have a role to play.

The following elements are recommended as the basis for program development.

7.5.1 Re-Engineered Photo Enforcement Equipment Installations

At a minimum and before the program is re-started, it is necessary that the vehicle detection loops used to trigger the photo enforcement cameras at 18 of the 19 photo-enforced intersections be re-located. At the same time, the City should consider the installation of enhanced advanced warning signs and investigate camera equipment upgrades, such as nearside cameras and auxiliary flashes, for selected locations.

7.5.2 Public Awareness and Information Campaign

As discussed above, the photo enforcement program should not be re-started without a comprehensive public awareness and information campaign in connection with the on-going operation and development of its photo enforcement program.

The public awareness and information campaign should encompass the following elements.

- Provide a clear description of the operation of the photo enforcement equipment in non-technical terms;
- Clearly state the program objectives;
- Describe the advantages of automated enforcement over manual enforcement;
- Explain other measures being taken to improve safety at intersections;
- Discuss the use of the photo enforcement program revenues;
- Re-launch the project with as much media and community support as possible;
- Outreach efforts to schools, driver education, local community groups, and all area media;
- Telephone and web-based information centers that include a hot-line for calls about intersection problems and traffic safety concerns in addition to handling inquiries regarding the operation of the photo enforcement program; and
- Ability to respond to telephone and e-mail inquiries and correspondence within not longer than one working day.

7.5.3 City Design and Construction Review

The red light camera improvements were not processed and installed within the normal procedures used by the City for construction improvements in the public rights of way. Instead, the process used for the installation work did not require the contractor to have improvement plans prepared and signed by a licensed California Civil or Electrical Engineer and then have the plans go through the City's normal plan check and construction inspection processes. With these processes in place, as-built drawings for the photo enforcement system installations reflecting the later changes in the location of the vehicle detection loops at three photo-enforced intersections would have been prepared and readily available for reference.

For any future modifications, changes, or expansion to the photo enforcement installations, the City's normal design review and construction inspection procedures should be in place and carried out. This will insure that up to date knowledge of the installations, is maintained by the City at all times.

7.5.4 Program Objectives

The program objectives need to be defined as clearly as possible as an early step for moving forward. It is clear that the primary objective of any red light running photo enforcement program, including the City's program, is the reduction of collisions at signalized intersections resulting from red light running. Furthermore, the accident data analysis results presented in Section 2 of this report indicate that the program has been highly effective at reducing the number of collisions attributable to red light running.

Importantly, program objectives should address specific operational objectives as well as objectives related to financial performance. The latter is especially important and questions such as whether or not each location where photo enforcement equipment is installed needs to be self-sustaining need to be addressed and incorporated into the statement of operational objectives. Additionally, the program objectives should support the development of a formula for the use of the revenues generated by the photo enforcement program, such as by the allocation of “x” percent of the program revenue for on-going accident data analysis and reporting; “y” percent for the development and maintenance of a public awareness and information campaign; and “z” percent for the funding or partial funding of other traffic safety improvements, not related to accidents caused by red light running violations.

7.5.5 On-Going Problem Identification and Analysis

The on-going analysis of the violations and citations issued data provided by the photo enforcement program as well as on-going analysis of intersection accident rates by type of accident together with community inputs are the basis for a comprehensive traffic safety improvement program.

A portion of the revenues derived from the photo enforcement program should be directed towards the necessary data analysis, problem identification, and problem diagnostic review work tasks.

In particular, it is recommended that the City review the violations data and accident data analysis presented in this report and, using that data, evaluate the measured effectiveness of the photo enforcement cameras at each of the 19 photo-enforced intersections. Before the program is re-started, the City could elect to not re-start at selected locations where the use of the cameras is not warranted by the accident rates or by the number of recorded violations.

7.5.6 Traffic Safety Partnership

The City's photo enforcement program is complex one that requires a very high level of quality control and the on-going coordination of activities related to operation and maintenance of systems that are owned and maintained by a third-party contractor with those of the City's Police Department, Traffic Engineering Department, and Traffic Courts. Clearly, the program also has significant visibility with the community at large and with their elected officials that require coordination primarily related to effectively communicating the program's objectives.

In the past, it appears that there has not been adequate coordination between all the necessary project participants. As the program moves forward, it is recommended that the Police Department establish a more broadly-based partnership with all the necessary project participants including the following:

- Police Department
- Traffic Engineering Department
- Public Works Department
- City Attorney's Office
- City Public Relations Office
- Photo Enforcement Services Contractor
- Selected Community Representatives
- Selected Outside Agency Representatives, such as Caltrans and Auto Club

A Coordinating Committee consisting of representatives from each project participant should be established and meet on a regular basis, monthly to start with but not less often than quarterly. Regular agenda items should be the review of the violations and citations issued data with a discussion of any changes or trends noted. Inputs from the City's Traffic Engineering Department and Street Maintenance Department should include regular updates on planned traffic signal modifications or street improvements construction that could impact the operation of the system. Discussion should be encouraged on whether program objectives are being met through the deployment of photo enforcement cameras or whether alternative measures should be applied. The group should have input to the regular prioritization of intersections targeted for safety-related improvements.

A monitoring program for the improved and timely collection and reporting of accident data is needed as a top priority item. Currently, both the Police and Traffic Engineering Departments have responsibilities for the collection and reporting of accident data. Traffic safety professionals from both Departments need to review intersection safety issues and conduct diagnostic reviews of intersections identified from the accident data tabulations as warranting safety-related improvements. A portion of the revenues from the photo enforcement program should be directed to enhancements in the accident data collection and reporting systems so that accident data trends can be more easily monitored.

Regular reports on the public awareness and information campaign should be tabled. Public use of the web site and telephone information systems should be monitored. Revenue collection should also be monitored so that the impact of changed policies can be evaluated.

7.5.7 Program Expansion

Typically, photo enforcement cameras are located at intersections based on one or more of three criteria:

- At "high risk" or historically dangerous intersections, based on the number of accidents or, where available, on an analysis of the number of accidents attributable to red light running;
- At intersections where a video pre-survey has counted a high number of red light running violations and where engineering observations suggest that a high percentage of the recorded violations should be able to be cited; and
- At geographically-dispersed intersections in order to distribute the presence of the photo enforcement cameras and warning signs, for fairness and to take advantage of the "spillover" effect of photo enforcement cameras in reducing accident rates at intersections in the vicinity of photo-enforced intersections.

Most agencies report that they use accident data as the primary means to locate red light cameras. Data regarding the total number of accidents may be used although intersections with high numbers of collisions may not have a high number of collisions related to red light running violations.

Agencies may also deploy photo enforcement cameras at locations where it is known that there are high numbers of red light running violations but not necessarily corresponding high numbers of collisions related to the red light running. Heavily traveled intersections where there are heavy left turn movements operated on protected left turn phases are often intersections of this type.

Vendors providing photo enforcement equipment and services typically conduct video pre-surveys to evaluate a short list of candidate intersections and make recommendations to agencies regarding the preferred locations based on the anticipated number of violations. Since the vendors are typically reimbursed from the fine revenues or any shortfall from fine revenues needs to be made up by the agency, it is advantageous to select locations where the potential number of citations issued is high. A published report for one established red light running program estimates that photo enforcement cameras must be located at intersections that experience at least 30 violations per day in order to be financially viable. At the same time, enforcement at the locations with a high number of potential violations serves to maximize the number of motorists who are directly affected by the program and who may alter their driving behavior as a result of the program.

Other criteria for the location of photo enforcement cameras includes suggestions from law enforcement and traffic safety professionals, inputs from community groups including complaints regarding red light running, traffic volumes, and political and historical factors. These criteria may be applied in conjunction with accident and violations or citations data.

Undesirable characteristics such as driveways that restrict camera pole or auxiliary flash placement such as driveways, approaches that are more than three lanes wide and double left turn lanes where views are more frequently obstructed, wide crossing streets where second photographs may not be taken at the pre-determined location due to motorists speeding up and slowing down as they traverse the intersection, and similar factors will also affect decisions regarding the installation of photo enforcement cameras.

For the City of San Diego, it is recommended that the photo enforcement program be expanded on the following basis:

- To provide uniform coverage throughout the City according to a pre-determined minimum coverage standard; or
- For intersection approaches where the accident rate for accidents caused by red light running exceeds a pre-determined minimum threshold standard; and
- For intersection approaches meeting one of the above standards where installation of the photo enforcement equipment is feasible and can be expected to meet or exceed the pre-determined minimum percent cited standard; or
- For intersection approaches where a diagnostic team review has determined that photo enforcement should be effective to mitigate a particular traffic safety hazard, even though the intersection approach may not be in compliance with one or both of the above standards.

Program expansion should also consider new photo enforcement technologies. The GATSO equipment being used by the City utilizes a proven and widely used film-based technology based on the ROBOT camera, the first version of which was deployed over 60 years ago for aerial surveillance purposes. Other photo enforcement technologies have become available over the past five years, most notably technologies that employ digital camera equipment where photographic data, including streamed video clips, may be immediately downloaded for processing using T-1 telephone line or microwave communications. Additionally, photo enforcement systems that use video-based and radar vehicle detection methods as well as systems that employ overhead camera placements and floodlighting equipment as an

alternative to the curb-based placements used for the San Diego program are being tested by cities throughout California and elsewhere. Figures 7-1 and 7-2 show field installations for photo enforcement systems using the new photo enforcement technologies.



**Figure 7-1
CURB MOUNTED DIGITAL
PHOTO ENFORCEMENT
CAMERA SYSTEM**



**Figure 7-2
OVERHEAD DIGITAL PHOTO
ENFORCEMENT CAMERA
SYSTEM**

It is important that the City Police Department stay in touch with other agencies and with the suppliers offering new photo enforcement technologies. These technologies may offer cost advantages since film does not need to be changed in the camera units and then processed, shorter turnaround times for mailing citations, and improved photographic data to be used as evidence of the recorded violations.

Where technologies appear to offer advantages that may be especially beneficial to the City, the technologies should be installed and tested. Unfortunately, testing of different equipment types is more difficult than for many other products due to the approach under which photo enforcement systems are currently marketed and deployed in California, that is, where the equipment suppliers are generally responsible for equipment installation, maintenance, and citation processing services. Ultimately, it is expected that the contractors offering hardware-independent photo enforcement support services will be available and serve to expand the possibilities for system testing and deployment by cities interested in enhancing public safety through the application of photo enforcement systems.